

Remarks

This paper is filed in response to the Office Action dated July 26, 2005. Claims 1-34 are pending, of which claims 28-33 are withdrawn. The Office Action rejects claims 1-17, 21-24 and 34 under 35 U.S.C. §103(a), as being unpatentable over U.S. Patent No. 6,230,069B1 to Campbell et al. (Campbell) in view of U.S. Patent No. 5,664,990 to Adams et al. (Adams). The Office Action also indicates that claims 18-20 and 25-27 would be allowable if rewritten in independent form including all limitations of the base and intervening claims.

Applicants thank the Examiner for the courtesy of the telephonic interview on September 22, 2005. Specifically, in accordance with 37 CFR Section 133:

- Claims 1-17, 21-24 and 34 were discussed
- Campbell and Adams were discussed
- Applicants distinguished the teachings of Campbell and Adams from the pending claims
- Thrust of argument presented: Campbell does not disclose a plurality of regions on the wafer, and Adams only discloses an annular "edge exclusion" zone that is not susceptible to uniform polishing, and is therefore discarded. Therefore neither Campbell or Adams separately or in combination teach "a model for wafer polishing that defines a plurality of substantially annular regions on a wafer and identifies a wafer material removal rate in a polishing step for each of the regions," as recited in claims 1 and 34.
- The Examiner agreed to reconsider the claims 1-27 and 34 in light of these distinctions.

Accordingly, Applicants submit the arguments below and respectfully request reconsideration of the claims.

Applicants have amended claim 2 to correct a typographical error. No new matter is added.

Independent claims 1 and 34 are not taught by the cited art separately or in combination. As indicated in the Office Action at page 5, Campbell teaches a method for controlling the manufacture of semiconductor wafers, but fails to teach a plurality of substantially annular regions on a wafer. More specifically, Campbell fails to teach “a model for wafer polishing that defines a plurality of substantially annular regions on a wafer and identifies a wafer material removal rate in a polishing step for each of the regions,” as recited in claims 1 and 34. Adams does not cure this omission. Adams teaches a slurry recycling process in which “there is inevitably an annular region about the periphery of the wafer where the polishing is not uniform, known in the art as ‘edge exclusion.’ Edge exclusion ... reduces the area of wafer from which good die can be obtained.” (col. 5, ll. 28-33) Thus, the annular region of Adams is a region that cannot be polished, and is therefore discarded.

First, there is no reason to combine the teachings of Campbell and Adams as they relate to different and unrelated aspects of a CMP polishing process. Campbell is directed to run-to-run process control of a CMP polishing tool. Adams is directed to the collection and recycling of spent CMP slurry. There is nothing about the way slurry is collected after polishing that informs the reader about run-to-run process control. Therefore, it is improper to combine these two references.

Furthermore, even if one were to consider Campbell and Adams in combination, there is no suggestion of a wafer polishing model that “defines a plurality of substantially annular regions on a wafer and identifies a wafer material removal rate in a polishing step for each of the regions” as recited in claims 1 and 34. The annular region of Adams is a region that cannot be

polished and that is therefore discarded. This observation does not suggest to one of skill in the art that annular regions should be included in a model defining polishing.

With regard to independent claims 2 and 21, these claims are also not taught by the cited art separately or in combination. Specifically, Campbell does not teach “a model for wafer polishing that defines a plurality of regions on a wafer and a plurality of polishing steps and identifies a wafer material removal rate in a polishing step of a polishing process for each of the regions....” Campbell’s model assumes constant wafer thickness (*See, e.g.*, col. 5, equation 7), and therefore does not define regions of the wafer. As discussed above, Adams does not cure this omission since Adams merely discloses a discarded region of edge exclusion that cannot be polished, and therefore is not amenable to wafer removal rate modeling.

In view of the above, applicants believe claims 1, 2, 21, and 34 and their dependents are patentable over the cited art, and that the pending application is in condition for allowance.

Authorization

Applicants authorize the commissioner to charge the \$120 fee for a one-month extension of time. Applicants believe that no other fee is currently due, but in the event that such a fee is required for this Reply, The Commissioner is hereby authorized to charge such fees, or credit any overpayment to deposit account no. 08-0219.

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